<110> Organization Name : Carlsberg A/S

Application Project

<120> Title : Barley for production of flavor-stable beer
<130> AppFileReference : 1
<140> CurrentAppNumber :
<141> CurrentFilingDate : ____-__-__

Sequence

<213> OrganismName : Hordeum vulgare cv. Barke
<400> PreSequenceString :

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<212> Type : DNA
<211> Length : 4165
SequenceName : SEQ ID NO: 1
SequenceDescription : Barley genomic sequence of cv. Barke, spanning
the start and stop codons of the gene encoding LOX-1

Sequence

<213> OrganismName : Hordeum vulgare mutant D112
<400> PreSequenceString :

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catccccaac agcatctcca tctaa 4165

<212> Type : DNA

<211> Length : 4165

SequenceName : SEQ ID NO: 2

SequenceDescription : Barley genomic sequence of mutant D112 spanning the segment, corresponding to the region between the start and stop codons of the gene encoding LOX-1 of cv. Barke

Sequence

<213> OrganismName : Hordeum vulgare cv. Barke

<400> PreSequenceString :

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EFLLKTITLH DVPGRSGNLT FVANSWIYPA ANYRYSRVFF ANDTYLPSQM PAALKPYRDD 180
ELRNLRGDDQ QGPYQEHDRI YRYDVYNDLG EGRPILGGNS DHPYPRRGRT ERKPNASDPS 240
LESRLSLLEQ IYVPRDEKFG HLKTSDFLGY SIKAITQGIL PAVRTYVDTT PGEFDSFQDI 300
INLYEGGIKL PKVAALEELR KQFPLQLIKD LLPVGGDSLL KLPVPHIIQE NKQAWRTDEE 360
FAREVLAGVN PVMITRLTEF PPKSSLDPSK FGDHTSTITA EHIEKNLEGL TVQQALESNR 420
LYILDHHDRF MPFLIDVNNL PGNFIYATRT LFFLRGDGRL TPLAIELSEP IIQGGLTTAK 480
SKVYTPVPSG SVEGWVWELA KAYVAVNDSG WHQLVSHWLN THAVMEPFVI STNRHLSVTH 540
PVHKLLSPHY RDTMTINALA RQTLINAGGI FEMTVFPGKF ALGMSAVVYK DWKFTEQGLP 600
DDLIKRGMAV EDPSSPYKVR LLVSDYPYAA DGLAIWHAIE QYVSEYLAIY YPNDGVLQGD 660
TEVQAWWKET REVGHGDLKD APWWPKMQSV PELAKACTTI IWIGSALHAA VNFGQYPYAG 720
FLPNRPTVSR RRMPEPGTEE YAELERDPER AFIHTITSQI QTIIGVSLLE VLSKHSSDEL 780
YLGQRDTPEW TSDPKALEVF KRFSDRLVEI ESKVVGMNHD PELKNRNGPA KFPYMLLYPN 840
TSDHKGAAAG LTAKGIPNSI SI 862

<212> Type : PRT

<211> Length : 862

SequenceName : SEQ ID NO: 3

SequenceDescription : Protein sequence of full-length LOX-1 protein of cv. Barke

Sequence

<213> OrganismName : Hordeum vulgare mutant D112
<400> PreSequenceString :

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ELRNLRGDDQ QGPYQEHDRI YRYDVYNDLG EGRPILGGNS DHPYPRRGRT ERKPNASDPS     240
LESRLSLLEQ IYVPRDEKFG HLKTSDFLGY SIKAITQGIL PAVRTYVDTT PGEFDSFQDI     300
INLYEGGIKL PKVAALEELR KQFPLQLIKD LLPVGGDSLL KLPVPHIIQE NKQAWRTDEE     360
FAREVLAGVN PVMITRLTEF PPKSSLDPSK FGDHTSTITA EHIEKNLEGL TVQQALESNR     420
LYILDHHDRF MPFLIDVNNL PGNFIYATRT LFFLRGDGRL TPLAIELSEP IIQGGLTTAK     480
SKVYTPVPSG SVEGWVWELA KAYVAVNDSG WHQLVSHWLN THAVMEPFVI STNRHLSVTH     540
PVHKLLSPHY RDTMTINALA RQTLINAGGI FEMTVFPGKF ALGMSAVVYK DWKFTEQGLP     600
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<212> Type : PRT
<211> Length : 665
SequenceName : SEQ ID NO: 4
SequenceDescription : Protein sequence of inactive, truncated LOX-1 of mutant D112

Sequence

<213> OrganismName : Hordeum vulgare cv. Neruda
<400> PreSequenceString :

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cggctccgtc gaaggctggg tgtgggagct cgccaaggcc tacgtcgccg tcaatgactc 2940
cgggtggcac cagctcgtca gccactggta cgttctccac ggtcgatgtg attcagtcag 3000
tcgatgcaca acaactgatc gaaatatgat tgattgaaac gcgcaggctg aacactcacg 3060

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gctgctctac cccaacacct ccgaccacaa gggcgccgct gccgggctta ccgccaaggg 4140
catccccaac agcatctcca tctaa 4165

<212> Type : DNA

<211> Length : 4165

SequenceName : SEQ ID NO: 5

SequenceDescription : Barley genomic sequence of cv. Neruda spanning the start and stop codons of the gene encoding LOX-1

Sequence

<213> OrganismName : Hordeum vulgare mutant A618

<400> PreSequenceString :

atgctgctgg gagggctgat cgacaccctc acgggggcga acaagagcgc ccggctcaag 60
ggcacggtgg tgctcatgcg caagaacgtg ctggacctca acgacttcgg cgccaccatc 120
atcgacggca tcggcgagtt cctcggcaag ggcgtcacct gccagcttat cagctccacc 180
gccgtcgacc aaggtaatca ctaccctcct ccggccttct cctctgttta caagatatag 240
tatttctttc gtgtgggccg gcggccatgg atggatggat gtgtctggat cggctaaaga 300
agataggata gctagccctg gccggtcgtc tttacctgag catgggcata tgccatcgaa 360
aaaagagaca acagcatgca tgcatggtgc gcgcaccaga ccacgcagag caccggatgc 420
tcgagacaaa gcaacacaac aagcaaggac gacacgtcaa aagcaacaca acaagcaagg 480
acggcacgtc aaaagcaaca caaacctaaa ctaaagcaca aagacgtaag agcaagcaca 540
caatcagcag gctataaaca gttgtcatca aaaacaacgc tggaagagag agagaaggaa 600

ggaagtagta gccatgaaaa attaaatcac cgggcgttgc tctttgccca acaattaatc 660
aagcaggata cgtggcatgt atagttcttg taagtaaact aagcatgtga tatgagaagg 720
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gggcatgaac catgacccgg agctcaagaa ccgcaacggc ccggctaagt ttccctacat 4080
gctgctctac cccaacacct ccgaccacaa gggcgccgct gccgggctta ccgccaaggg 4140
catccccaac agcatctcca tctaa 4165

<212> Type : DNA
<211> Length : 4165
SequenceName : SEQ ID NO: 6
SequenceDescription : Barley genomic sequence of mutant A618, spanning the segment corresponding to the region between the start and stop codons of the gene encoding LOX-1 of cv. Neruda

Sequence

<213> OrganismName : Hordeum vulgare cv. Neruda
<400> PreSequenceString :

MLLGGLIDTL TGANKSARLK GTVVLMRKNV LDLNDFGATI IDGIGEFLGK GVTCQLISST 60
AVDQDNGGRG KVGAEAELEQ WVTSLPSLTT GESKFGLTFD WEVEKLGVPG AIVVNNYHSS 120
EFLLKTITLH DVPGRSGNLT FVANSWIYPA ANYRYSRVFF ANDTYLPSQM PAALKPYRDD 180
ELRNLRGDDQ QGPYQEHDRI YRYDVYNDLG EGRPILGGNS DHPYPRRGRT ERKPNASDPS 240
LESRLSLLEQ IYVPRDEKFG HLKTSDFLGY SIKAITQGIL PAVRTYVDTT PGEFDSFQDI 300
INLYEGGIKL PKVAALEELR KQFPLQLIKD LLPVGGDSLL KLPVPHIIQE NKQAWRTDEE 360
FAREVLAGVN PVMITRLTEF PPKSSLDPSK FGDHTSTITA EHIEKNLEGL TVQQALESNR 420

LYILDHHDRF MPFLIDVNNL PGNFIYATRT LFFLRGDGRL TPLAIELSEP IIQGGLTTAK 480
SKVYTPVPSG SVEGWVWELA KAYVAVNDSG WHQLVSHWLN THAVMEPFVI STNRHLSVTH 540
PVHKLLSPHY RDTMTINALA RQTLINAGGI FEMTVFPGKF ALGMSAVVYK DWKFTEQGLP 600
DDLIKRGMAV EDPSSPYKVR LLVSDYPYAA DGLAIWHAIE QYVSEYLAIY YPNDGVLQGD 660
TEVQAWWKET REVGHGDLKD APWWPKMQSV PELAKACTTI IWIGSALHAA VNFGQYPYAG 720
FLPNRPTVSR RRMPEPGTEE YAELERDPER AFIHTITSQI QTIIGVSLLE VLSKHSSDEL 780
YLGQRDTPEW TSDPKALEVF KRFSDRLVEI ESKVVGMNHD PELKNRNGPA KFPYMLLYPN 840
TSDHKGAAAG LTAKGIPNSI SI 862

<212> Type : PRT
<211> Length : 862
SequenceName : SEQ ID NO: 7
SequenceDescription : Protein sequence of full-length LOX-1 protein of cv. Neruda

Sequence

<213> OrganismName : Hordeum vulgare mutant A618
<400> PreSequenceString :
MLLGGLIDTL TGANKSARLK GTVVLMRKNV LDLNDFGATI IDGIGEFLGK GVTCQLISST 60
AVDQDNGGRG KVGAEAELEQ WVTSLPSLTT GESKFGLTFD WEVEKLGVPG AIVVNNYHSS 120
EFLLKTITLH DVPGRSGNLT FVANSWIYPA ANYRYSRVFF ANDTYLPSQM PAALKPYRDD 180
ELRNLRGDDQ QGPYQEHDRI YRYDVYNDLG EGRPILGGNS DHPYPRRGRT ERKPNASDPS 240
LESRLSLLEQ IYVPRDEKFG HLKTSDFLGY SIKAITQGIL PAVRTYVDTT PGEFDSFQDI 300
INLYEGGIKL PKVAALEELR KQFPLQLIKD LLPVGGDSLL KLPVPHIIQE NKQAWRTDEE 360
FAREVLAGVN PVMITRLTMS QRLFVHCVCM VSMVRKCRS 399

<212> Type : PRT
<211> Length : 399
SequenceName : SEQ ID NO: 8
SequenceDescription : Protein sequence of inactive, truncated LOX-1 of mutant A618

Sequence

<213> OrganismName : Oligonucleotide
<400> PreSequenceString :
gaaagcgagg agaggaggcc aagaacaa 28

<212> Type : DNA
<211> Length : 28
SequenceName : SEQ ID NO: 9

SequenceDescription : Oligonucleotide primer used for PCR amplification (sense primer)

Sequence

<213> OrganismName : Oligonucleotide
<400> PreSequenceString :
ttattcatcc atggttgccg atggcttaga 30
<212> Type : DNA
<211> Length : 30
SequenceName : SEQ ID NO: 10
SequenceDescription : Oligonucleotide primer used for PCR amplification (antisense primer)

Sequence

<213> OrganismName : Oligonucleotide
<400> PreSequenceString :
agggactgcc ggacgatctc a 21
<212> Type : DNA
<211> Length : 21
SequenceName : SEQ ID NO: 11
SequenceDescription : Oligonucleotide primer used for PCR amplification (sense primer)

Sequence

<213> OrganismName : Oligonucletide
<400> PreSequenceString :
gccagctccg gcacactt 18
<212> Type : DNA
<211> Length : 18
SequenceName : SEQ ID NO: 12
SequenceDescription : Oligonucleotide primer used for PCR amplification (antisense primer)

Sequence

<213> OrganismName : Oligonucleotide

<400> PreSequenceString :
caaggtgcgg ttgctggtgt c 21
<212> Type : DNA
<211> Length : 21
SequenceName : SEQ ID NO: 13
SequenceDescription : Oligonucleotide primer used for PCR amplification (sense primer)

Sequence

<213> OrganismName : Oligonucleotide
<400> PreSequenceString :
ctcgcgcgtc tccttccac 19
<212> Type : DNA
<211> Length : 19
SequenceName : SEQ ID NO: 14
SequenceDescription : Oligonucleotide primer used for PCR amplification (antisense primer) Sequence
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<213> OrganismName : Oligonucleotide
<400> PreSequenceString :
ctcgcgcgtc tccttccat 19
<212> Type : DNA
<211> Length : 19
SequenceName : SEQ ID NO: 15
SequenceDescription : Oligonucleotide primer used for PCR amplification (antisense primer

Sequence

<213> OrganismName : Oligonucleotide
<400> PreSequenceString :
tacgtgccgc gggacgagaa g 21
<212> Type : DNA
<211> Length : 21
SequenceName : SEQ ID NO: 16
SequenceDescription : Oligonucleotide primer used for PCR amplification (sense primer)

Sequence

<213> OrganismName : Oligonucleotide
<400> PreSequenceString :
tgatcatgac cgggttgacg t 21
<212> Type : DNA
<211> Length : 21
SequenceName : SEQ ID NO: 17
SequenceDescription : Oligonucleotide primer used for PCR amplification (antisense primer)

Sequence

<213> OrganismName : Oligonucleotide
<400> PreSequenceString :
catatgctgc tgggagggct g 21
<212> Type : DNA
<211> Length : 21
SequenceName : SEQ ID NO: 18
SequenceDescription : Oligonucleotide primer used for PCR amplification (sense primer)

Sequence

<213> OrganismName : Oligonucleotide
<400> PreSequenceString :
gaattcttag atggagatgc tgttggg 27
<212> Type : DNA
<211> Length : 27
SequenceName : SEQ ID NO: 19
SequenceDescription : Oligonucleotide primer used for PCR amplification (antisense primer)

Sequence

<213> OrganismName : Oligonucleotide
<400> PreSequenceString :
ctacccgtac gcggcggacg ggct 24
<212> Type : DNA

<211> Length : 24
SequenceName : SEQ ID NO: 20
SequenceDescription : Oligonucleotide primer used for PCR amplification (sense primer)

Sequence

<213> OrganismName : Oligonucleotide
<400> PreSequenceString :
tcctgaattc acgcctgcac ctccgtatcg c 31
<212> Type : DNA
<211> Length : 31
SequenceName : SEQ ID NO: 21
SequenceDescription : Oligonucleotide primer used for PCR amplification (antisense primer)